WE CLAIM:

1.   An adaptable multiuser processing unit providing a plurality of estimated user signals for each user communication signal of a transmitted communication channel signal in a multi-access network, comprising:

    a processor receiving the transmitted communication channel signal and providing said plurality of estimated user signals in accordance with control parameters being modified by an error feedback signal having a plurality of components, each of the plurality of components being related to said estimated user signal; and

    a feedback unit receiving and comparing the plurality of estimated user signals for each user and providing the error feedback signal to the processor.

2.   The adaptable multiuser processing unit as claimed in claim 1, wherein the processor is a symbol detection unit providing a plurality of symbols, further wherein the feedback unit receives and compares the plurality of symbols for each user and provides the error feedback signal to the symbol detection unit.

3.   The adaptable multiuser processing unit as claimed in claim 1, wherein said processor comprises a first filter unit receiving a transmitted communication channel signal and providing a plurality of estimated user signals, further comprising a de-spreader unit receiving the plurality of

estimated user signals at the chip rate of the processor and providing a plurality of estimated symbols for each user at a given symbol rate and a symbol detection unit receiving the plurality of estimated user signals at the symbol rate and providing a plurality of estimated symbols for each user, the feedback unit receiving and comparing at least the plurality of estimated user signals at the symbol rate with the plurality of estimated symbols for each user to provide the error feedback signal at the chip rate to the first filter unit.

4   The adaptable multiuser processing unit as claimed in claim 1, wherein the processor comprises a first filter unit receiving a transmitted communication channel signal and providing a plurality of estimated user signals, further comprising a symbol detection unit receiving the plurality of estimated user signals and providing a plurality of symbols for each user, the feedback unit receiving and comparing at least the plurality of estimated user signals with the plurality of estimated symbols for each user to provide the error feedback signal to the first filter unit.

5.   The adaptable multiuser processing unit as claimed in claim 3, wherein the first filter unit is an equalizer filter.

6.   The adaptable multiuser processing unit as claimed in claim 4, wherein the first filter unit is a signature filter.

7.   The adaptable multiuser processing unit as claimed in claim 5, wherein the feedback unit receives and compares at

least the plurality of estimated user signals with a training sequence signal provided by a training sequence generator to provide the error feedback signal to the equalizer filter.

8.   The adaptable multiuser processing unit as claimed in claim 6, wherein the feedback unit receives and compares at least the plurality of estimated user signals with a training sequence signal provided by a training sequence generator to provide the error feedback signal to the signature filter.

9.   The adaptable multiuser processing unit as claimed in claim 2, wherein the feedback unit receives at least a training sequence signal provided by a training sequence generator and provides the error feedback signal to the symbol detection unit.

10.   The adaptable multiuser processing unit as claimed in claim 3, wherein the processor further comprises a second filter unit receiving the plurality of estimated user signals and providing a plurality of filtered estimated signals for each user, further wherein the symbol detection unit receives the plurality of filtered estimated signals for each user and provides a plurality of estimated symbols for each user, the feedback unit receiving and comparing at least the plurality of symbols for each user to provide the error feedback signal to the first filter unit.

11.   The adaptable multiuser processing unit as claimed in claim 4, wherein the processor further comprises a second filter unit receiving the plurality of estimated user signals and providing a plurality of filtered estimated signals for

each user, further wherein the symbol detection unit receives the plurality of filtered estimated signals for each user and provides a plurality of estimated symbols for each user, the feedback unit receiving and comparing at least the plurality of symbols for each user to provide the error feedback signal to the first filter unit.

12. The adaptable multiuser processing unit as claimed in claim 10, wherein the feedback unit further provides the error feedback signal to the second filter unit.

13. The adaptable multiuser processing unit as claimed in claim 11, wherein the feedback unit further provides the error feedback signal to the second filter unit.

14. The adaptable multiuser processing unit as claimed in claim 12, wherein the first filter unit comprises an equalizer filter.

15. The adaptable multiuser processing unit as claimed in claim 13, wherein the first filter unit comprises an equalizer filter.

16. The adaptable multiuser processing unit as claimed in claim 14, wherein the second filter unit comprises a signature filter.

17. The adaptable multiuser processing unit as claimed in claim 15, wherein the second filter unit comprises a signature filter.

18. The adaptable multiuser processing unit as claimed in claim 1, wherein the processor comprises a plurality of filter units, each receiving a transmitted communication channel signal and each providing a plurality of estimated user signals to a combining unit, the combining unit providing a plurality of estimated combined user signals, further comprising a symbol detection unit receiving the plurality of estimated combined user signals and providing a plurality of symbols for each user, the feedback unit receiving and comparing at least the plurality of symbols for each user to provide the error feedback signal to each of the plurality of filter units.

19. The adaptable multiuser processing unit as claimed in claim 3, wherein the first filter unit comprises a decision feedback module receiving the plurality of estimated user signals and comprising a plurality of decision parameters for each user.

20. The adaptable multiuser processing unit as claimed in claim 4, wherein the first filter unit comprises a decision feedback module receiving the plurality of estimated user signals and comprising a plurality of decision parameters for each user.

21. The adaptable multiuser processing unit as claimed in claim 5, wherein the equalizer filter comprises a decision feedback module receiving the plurality of estimated user signals and comprising a plurality of decision parameters for each user.

22. The adaptable multiuser processing unit as claimed in claim 6, further wherein said signature filter comprises a decision feedback module receiving the plurality of estimated user signals and comprising a plurality of decision parameters for each user.

23. The adaptable multiuser processing unit as claimed in claim 10, wherein anyone of the first filter unit and of the second filter unit comprises a decision feedback module receiving the plurality of estimated user signals and comprising a plurality of decision parameters for each user.

24. The adaptable multiuser processing unit as claimed in claim 11, wherein anyone of the first filter unit and of the second filter unit comprises a decision feedback module receiving the plurality of estimated user signals and comprising a plurality of decision parameters for each user.

25. The adaptable multiuser processing unit as claimed in claim 12, wherein any one of the first filter unit and of the second filter unit comprises a decision feedback module receiving the plurality of estimated user signals and comprising a plurality of decision parameters for each user.

26. The adaptable multiuser processing unit as claimed in claim 13, wherein any one of the first filter unit and of the second filter unit comprises a decision feedback module receiving the plurality of estimated user signals and comprising a plurality of decision parameters for each user.

27. The adaptable multiuser processing unit as claimed in claim 22, further wherein said symbol detection unit further comprises a decision feedback module receiving the plurality of symbols for each user and comprising a plurality of decision parameters for each user.

28. The adaptable multiuser processing unit as claimed in claim 27, wherein the signature filter comprises at least one fractionally-spaced signature filter.

29. The adaptable multiuser processing unit as claimed in claim 27, further comprising a combiner receiving a plurality of transmitted communication signals and providing a combined transmitted communication signal to said signature filter.

30. The adaptable multiuser processing unit as claimed in claim 27, further comprising an oversampling unit comprising an oversampler and a combiner, said oversampler receiving the transmitted communication signal and providing a plurality of oversampled communication signals to the combiner, the combiner further providing a combined transmitted communication signal to said signature filter.

31. The adaptable multiuser processing unit as claimed in claim 18, wherein each of the plurality of filter units is a fractionally-spaced signature filter, further wherein said symbol detection unit further comprises a decision feedback module receiving the plurality of symbols for each user and comprising a plurality of decision parameters for each user, further wherein each of said fractionally-spaced signature filter comprises a decision feedback module receiving the

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plurality of estimated user signals and comprising a plurality of decision parameters for each user.

32. The adaptable multiuser processing unit as claimed in claim 27, wherein the signature filter comprises a plurality of fractionally-spaced signature filters each providing a plurality of estimated user signals, further wherein the symbol detection unit comprises a fractionally-spaced symbol detection unit receiving the plurality of estimated user signals provided by each of the plurality of fractionally-spaced signature filters.

33. The adaptable multiuser processing unit as claimed in claim 32, wherein the fractionally-spaced symbol detection unit comprises a plurality of fractionally-spaced symbol detection units, each of the plurality of fractionally-spaced symbol detection units receiving the plurality of estimated user signals from each of the plurality of fractionally-spaced signature filters, further comprising a combiner receiving the plurality of symbols for each user from each of the plurality of fractionally-spaced symbol detection units, the combiner providing a combined plurality of symbol for each user.